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P4.007 Neutral beam assisted plasma breakdown on tokamak COMPASS

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Using helium as a working gas in COMPASS tokamak is a vital part of the research program. Unfortunately plasma breakdown in helium is quite difficult owing to helium's high ionization potential. In the absence of impurities with lower ionization energies helium plasma breakdown is very sensitive to start-up parameters and thus unreliable. To mitigate this issue several methods have been proposed. Using Neutral Beam Injectors as a source of ionized particles is an elegant solution. COMPASS is equipped with two neutral beam injectors. Both can deliver up to 350 kW of neutral particles with energies of up to 40 keV.

In this contribution we present the results obtained during Neutral beam injection assisted plasma breakdown in deuterium and helium plasmas. Breakdowns have been successful at lower loop voltages than without neutral beam injection. Timing of the breakdown was also more consistent. Since installed neutral beam injector use cryo condensation pumps, the argon frosting technique has been used to facilitate sufficient pumping of Helium for reliable operation of the injectors. Performance of the argon frosted cryopumps is also reviewed

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